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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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OBLON, SPIVAK, MCCLELLAND, MAIER & NEUSTADT, P.C.
1940 DUKE STREET
ALEXANDRIA, VA 22314

EXAMINER

FORMAN, BETTY J

ART UNIT	PAPER NUMBER
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1634

DATE MAILED: 05/27/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No. 09/890,261	Applicant(s) LIVACHE ET AL.	
	Examiner BJ Forman	Art Unit 1634	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 04 April 2003.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-19 is/are pending in the application.
- 4a) Of the above claim(s) 16-19 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-15 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 07 August 2001 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) Paper No(s). _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449) Paper No(s) <u>Oct '01</u> . | 6) <input type="checkbox"/> Other: |

DETAILED ACTION

Priority

1. Receipt is acknowledged of papers submitted under 35 U.S.C. 119(a)-(d), which papers have been placed of record in the file.

Information Disclosure Statement

2. The information disclosure statement filed October 2001 fails to comply with 37 CFR 1.98(a)(2), which requires a legible copy of each foreign patent; each publication or that portion which caused it to be listed; and all other information or that portion which caused it to be listed.

The references provided and the U.S. Patents have been reviewed and considered. The 1449 has been initialed so as to indicate the reviewed and considered references. A copy of the initialed 1449 is being supplied with this action. Furthermore, the International Search Report has been reviewed. However, references listed on the 1449 that have been not provided have not been considered.

Claim Rejections - 35 USC § 112

3. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

4. Claims 1-15 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

The claims are drawn to a method for producing a matrix. However, the claims do not recite positive and active method steps but instead recite general descriptions of the matrix and components thereof.

Method claims need not recite all operating details but should at least recite positive, active steps so that the claims will set out and circumscribe a particular area with a reasonable degree of precision and particularity and make clear what subject matter that claims encompass as well as make clear the subject matter from which others would be precluded, *Ex parte Erlich*, 3 USPQ2d 1011 at 6.

a. Claims 1-15 are indefinite in Claim 1 because the claim is drawn to a method however the claim does not recite method steps. It is suggested that Claim 1 be amended to recite positive and active method steps e.g. depositing, fixing, polymerization etc.

b. Claims 1-15 are indefinite in Claim 1, line 4 for the recitation "at least one element is able to dispense the ligand" because it is unclear whether the element dispenses the ligand or is merely capable of dispensing. It is suggested that Claim 1 be amended to recite positive and active method steps e.g. replace "is able to dispense" with "dispenses".

c. Claims 1-15 are indefinite in Claim 1, lines 5-6 for the recitation "an electropolymerisable monomer as electrode" because it is unclear whether the recitation is intended to define the monomer as an electrode. It is suggested that Claim 1 be amended to clarify.

Art Unit: 1634

d. Claims 2 and 3 are indefinite in Claim 2 for the recitation “and having a conductive part” because it is unclear whether the recitation modifies the ligand or the reservoir. It is suggested that Claim 2 be amended to clarify.

d. Claim 3 is indefinite for the recitation “is provided with ligand insertion and evacuation means” because it is unclear whether the recitation is a method step of providing or whether the recitation is describing structural components of the reservoir. It is suggested that Claim 3 be amended to clarify.

e. Claim 4 is indefinite because it is unclear whether the claim is reciting method steps of charging the electrode, contacting the electrode to the carrier and/or fixing or whether the claim is reciting structural limitations of the element i.e. containing a wire or needle. It is suggested that Claim 4 be amended to clarify by reciting positive and active method steps.

f. Claim 4 is indefinite in lines 5-6 for the recitation “a conductive zone” because it is unclear whether the recitation refers to the conductive zone of Claim 1 or a different conductive zone. It is suggested that Claim 4 be amended to clarify e.g. replace “a” with “the”.

g. Claim 4 is indefinite in line 6 for the recitation “being assured” because it is unclear whether the recitation is a mental step of assurance or whether the recitation is intended to limit the fixing in some undefined way. It is suggested that Claim 4 be amended to clarify.

h. Claim 4 is indefinite in lines 6-7 for the recitation “the fixing operation” because the recitation lacks proper antecedent basis in Claim 1. It is suggested that Claim 4 be amended to provide proper antecedent basis e.g. amend Claim 1 to recite a fixing step and amend Claim 4 to delete “operation”.

i. Claim 5 is indefinite for the recitation “several element” because it is unclear whether the recitation refers to the “at least one element” of Claim 1. It is suggested that Claim 5 be amended to clarify e.g. after “several” insert “of said at least one”.

Art Unit: 1634

j. Claim 5 is indefinite for the recitation "different conductive sites" because the recitation lacks proper antecedent basis in the "conductive zones" of Claim 1. It is suggested that Claim 5 be amended to provide proper antecedent basis e.g. replace "sites" with "zones".

k. Claim 5 is indefinite for the recitation "respectively dispensing" because "respectively" is a non-specific relational term. Therefore, the relationship between the elements and the dispensing is undefined. It is suggested that Claim 5 be amended to define the relationship.

l. Claim 7 is indefinite for the recitation "a single element" because it is unclear whether the recitation refers to the "at least one element" of Claim 1. It is suggested that Claim 7 be amended to clarify e.g. replace "a single" with "one of said at least one".

m. Claim 8 is indefinite for the recitation "the conductive zones are formed of zones of conductive material arranged on an insulating carrier" because it is unclear whether the recitation is a method step of forming and arranging or whether the recitation is describing physical arrangement of the structural components. It is suggested that Claim 8 be amended to clarify.

Claim Rejections - 35 USC § 102

5. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Art Unit: 1634

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

As detailed above, the claims are replete with indefinite words, indefinite phrases and unclear method steps. For purposes of examination, the claims are interpreted as discussed below.

6. Claims 1-2, 5, 7-9, 11 and 13-15 are rejected under 35 U.S.C. 102(b) as being anticipated by Krihak et al (U.S. Patent No. 5,810,989, issued 22 September 1998).

Regarding Claim 1, Krihak et al disclose a method for producing a matrix comprising a fixed ligand (Claim 1) the method comprising fixing the ligand by electrochemical route to a conductive carrier (photoconductive carrier) in which at least one element (i.e. support structure containing the conductive carrier) which is used to dispense the ligand coupled to an electropolymerisable monomer (i.e. oligonucleotide modified pyrrole monomer) to thereby carry out electrically assisted synthesis of a polymer carrying the ligands on the conductive carrier or on the conductive zones of the carrier (Column 1, line 59-Column 2, line 25 and Claims 1-20).

Regarding Claim 2, Krihak et al disclose the method wherein the element is made up of a reservoir containing the ligand coupled to electropolymerisable monomer and having a conductive part (i.e. the support structure containing the conductive carrier, fig. 1 and Column 2, lines 50-65).

Regarding Claim 5, Krihak et al disclose the method wherein identical or different ligands are fixed successively on different conductive sites of the carrier by using several elements (i.e. opening in the mask, Fig. 1) thereby dispensing identical or different ligands (Column 3, lines 24-38).

Regarding Claim 7, Krihak et al disclose the method wherein at least two different ligands are successively fixed to different sites of the carrier using a single element and by changing at least once the ligand dispensed by this element i.e. a single support structure containing the conductive carrier is used and the solution within the structure is changed to fix at least two different ligands (Column 3, lines 24-38).

Regarding Claim 8, Krihak et al disclose the method wherein conductive zones are formed of zones of conductive material i.e. conductive pads arranged on an insulating carrier i.e. transparent substrate (Column 4, lines 14-27 and Fig. 5).

Regarding Claim 9, Krihak et al disclose the method wherein the zones of conductive material are electrically interconnected i.e. via leads #48 (Column 3, lines 60-65 and Fig. 5).

Regarding Claim 11, Krihak et al disclose the method wherein the conductive material is chosen from the group made up of gold, silver, platinum, indium and tin oxide (ITO), carbon and conductive organic polymers (Column 2, lines 57-65).

Regarding Claim 13, Krihak et al disclose the method wherein the electropolymerisable monomer is pyrrole (Column 3, lines 10-15).

Regarding Claim 14, Krihak et al disclose the method wherein the fixing of the ligand is obtained by electro-copolymerization of the monomer and of the ligand coupled to the monomer (Column 3, lines 10-23).

Regarding Claim 15, Krihak et al disclose the method wherein the ligand is a nucleotide, an oligonucleotide (Column 3, lines 10-15).

Claim Rejections - 35 USC § 103

7. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

8. Claims 1-3, 5-8 and 11-15 are rejected under 35 U.S.C. 103(a) as being unpatentable over Wang et al (U.S. Patent No. 6,468,785 filed 19 February 1999) in view of Brennan et al (U.S. Patent No. 5,474,796, filed 27 May 1993).

Regarding Claim 1, Wang et al teach a method for producing a matrix comprising a fixed ligand the method comprising fixing the ligand by electrochemical route to a conductive carrier (electrode) in which at least one element (i.e. microfabrication technology) which is used to dispense the ligand coupled to an electropolymerisable monomer to thereby carry out electrically assisted synthesis of a polymer carrying the ligands on the conductive carrier or on the conductive zones of the carrier (Column 9, lines 7-44 and Column 12, lines 43-55). Wang et al teach that well known microfabrication technologies are used to dispense their monomer but they do not specifically teach the microfabrication elements. However, microfabrication elements were well known in the art at the time the claimed invention was made as taught by Brennan et al who teach that their microfabrication element deliver monomers to specific locations on the carrier (Column 3, lines 61-65). It would have been obvious to one of ordinary skill in the art at the time the claimed invention was made to apply the microfabrication elements of Brennan et al to the dispensing of Wang et al based on the teaching of Wang et al wherein such elements are used (Column 12, lines 43-55).

Regarding Claim 2, Brennan et al teach the element is made up of a reservoir for containing the ligand to be dispensed (Fig. 5).

Art Unit: 1634

Regarding Claim 3, Brennan et al teach the element wherein the reservoir is provided with ligand insertion (i.e. inlet) and evacuation (nozzle) means (Fig. 5).

Regarding Claim 5, Wang et al teach the method wherein identical or different ligands are fixed on different conductive sites of the carrier by using several elements (i.e. microfabrication technology) thereby dispensing identical or different ligands (Column 3, lines 24-38) and Brennan et al teach the several elements (Fig. 6).

Regarding Claim 6, Brennan et al teach the microfabrication elements wherein at least two are grouped together to form a print head (Fig. 6).

Regarding Claim 7, Wang et al teach the method wherein at least two different ligands are fixed to different sites of the carrier using a single element and by changing at least once the ligand dispensed by this element i.e. multiple ligand are fixed to different sites using microfabrication technology thereby dispensing identical or different ligands (Column 3, lines 24-38) and Brennan et al teach the technology wherein a single element dispenses to different sites (see Fig. 6 wherein each element dispenses to multiple sites) (Column 8, lines 25-67).

Regarding Claim 8, Wang et al teach the method wherein conductive zones are formed of zones of conductive material i.e. electrodes (Column 10, lines 1-9).

Regarding Claim 11, Wang et al teach the method wherein the conductive material is chosen from the group made up of gold, silver, platinum, indium and tin oxide (ITO), carbon and conductive organic polymers (Column 10, lines 1-9).

Regarding Claim 12, Wang et al teach the method wherein a solution of ligand containing the ligand coupled to an electropolymerisable monomer, the electropolymerisable monomer and optionally a doping agent is dispensed (Column 9, lines 7-35) and Brennan teaches that each element dispenses monomers (Fig. 6).

Regarding Claim 13, Wang et al teach the method wherein the electropolymerisable monomer is pyrrole (Column 9, lines 7-35).

Art Unit: 1634

Regarding Claim 14, Wang et al teach the method wherein the fixing of the ligand is obtained by electro-copolymerization of the monomer and of the ligand coupled to the monomer (Column 9, lines 7-35).

Regarding Claim 15, Wang et al teach the method wherein the ligand is a nucleotide, an oligonucleotide (Column 7, lines 7-35).

9. Claims 4 and 9-10 are rejected under 35 U.S.C. 103(a) as being unpatentable over Wang et al (U.S. Patent No. 6,468,785 filed 19 February 1999) in view of Brennan et al (U.S. Patent No. 5,474,796, filed 27 May 1993) as applied to Claim 1 above and further in view of Ohakwa (U.S. Patent No. 5,486,337, filed 18 February 1994).

Regarding Claim 4, Wang et al teach a method for producing a matrix comprising a fixed ligand the method comprising fixing the ligand by electrochemical route to a conductive carrier (electrode) in which at least one element (i.e. microfabrication technology) which is used to dispense the ligand coupled to an electropolymerisable monomer to thereby carry out electrically assisted synthesis of a polymer carrying the ligands on the conductive carrier or on the conductive zones of the carrier (Column 9, lines 7-44 and Column 12, lines 43-55). Wang et al teach that well known microfabrication technologies are used to dispense their monomer but they do not specifically teach the microfabrication elements. However, microfabrication elements were well known in the art at the time the claimed invention was made as taught by Brennan et al who teach that their microfabrication element deliver monomers to specific

Art Unit: 1634

locations on the carrier (Column 3, lines 61-65). It would have been obvious to one of ordinary skill in the art at the time the claimed invention was made to apply the microfabrication elements of Brennan et al to the dispensing of Wang et al based on the teaching of Wang et al wherein such elements are used (Column 12, lines 43-55).

Wang et al and Brennan et al do not teach the element is made of wire or needle form. However, needle formed elements for dispensing monomers were well known in the art at the time the claimed invention was made as taught by Ohkawa who teach their needle formed dispensing element wherein when charged externally with ligand, contact between the electrode and the conductive carrier or a conductive zone of the carrier being fixes the ligand to the carrier (Column 7, lines 8-52). It would have been obvious to one of ordinary skill in the art at the time the claimed invention was made to modify the element of Brennan et al with the needle formed and chargable element of Ohkawa to thereby electronically and accurately dispense ligand solution for the obvious benefits of manipulating dispensing as desired as taught by Ohkawa (Column 3, lines 46-54).

Regarding Claims 9-10, Wang et al teach the method comprising a plurality of zones of conductive material (i.e. electrodes, Column 12, line 43-Column 13, line 25) but they do not specifically the zones are electrically interconnected. However, Ohkawa teach a similar plurality of conductive zones wherein the zones are electrically interconnected and wherein the zones are addressable either separately or in groups (Fig. 1-3) whereby placement of ligand solutions on the plurality of areas is controlled (Column 6, lines 50-62). It would have been obvious to one of ordinary skill in the art at the time the claimed invention was made to apply the electro connection and control of Ohkawa to the plurality of electrodes of Wang et al to thereby control placement of ligand solutions on the plurality of areas as taught by Ohkawa (Column 6, lines 50-62).

Art Unit: 1634

Conclusion

10. No claim is allowed.

11. Any inquiry concerning this communication or earlier communications from the examiner should be directed to BJ Forman whose telephone number is (703) 306-5878. The examiner can normally be reached on 6:30 TO 4:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Gary Jones can be reached on (703) 308-1152. The fax phone numbers for the organization where this application or proceeding is assigned are (703) 308-4242 for regular communications and (703) 308-8724 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0196.



BJ Forman, Ph.D.
Patent Examiner
Art Unit: 1634
May 23, 2003